

**Positive Train Control (PTC) Full Working Group
August 14-15, 2001 - Colorado Springs, CO**

August 14: Full Working Group Meeting convened at 1 p.m.

Note: All of the meeting presentations will be posted on the Volpe Website at:
<http://imsserver.volpe.dot.gov>. There are no user ID's or passwords required.

Filenames and their association with the presenters are as follows:

No.	Presenter & Organization	Filename (all Adobe PDF format)
1	Dr. Ted Giras - UVA Dr. Lori M. Kaufman - UVA Marc E. Monfalcone - UVA	• Safety Case • RSAC Safety Case Review
2	John Wreathall & Emilie Roth	Human Factors Presentation
3	Alan Polivka	IDOT Update - Polivka
4	Howard Moody	IDOT Update - Moody
5	Andy Schiestl	BNSF Roadway Worker Systems
6	Ed Dobranetski	NTSB Recommendation of 06-12-2001

- Dean Hollingsworth called to order the Full Working Group at 1 p.m. with a safety briefing.
- Ted Bundy asked the Full Working Group to review the minutes of the March 2001 meeting. There were no comments and the task force voted to accept the minutes as they stand. Ted distributed a group roster which included the name and e-mail address information for all in attendance to review and sign.
- Grady Cothen addressed the group and indicated that the NPRM was published on August 10. Grady also announced that FRA has a new Administrator and Deputy Administrator, Allan Rutter is the Administrator, and Betty Monro is the Deputy Administrator. Grady stated that this afternoon Dr. Ted Giras will brief the group on ASCAP, and asked that everyone hold their questions and comments until the briefing has concluded.
- Dr. Ted Giras started by introducing two members of the ASCAP Team, Dr. Lori M. Kaufman and Marc E. Monfalcone. Dr. Giras briefed the group on the ASCAP Safety Case, starting with the Outline, which consisted of the Preamble and the Safety Case. Dr. Giras asked Manuel Galdo to be the keeper of an FRA "Punch List", which are enhancements items that remain to be resolved. Dr. Giras stated that we have a disconnect in how we are handling Human Factors, and this needs to be discussed by the group tomorrow.
- Drs. Giras and Kaufman, and Mr. Monfalcone, delivered a PowerPoint presentation that outlined the complete 410 page draft document produced by the University of Virginia and entitled "CSX Communication-Based Traffic Management (CBTM) System Safety Case".

- The presentation began about 1:15 p.m. and ended about 3:30 p.m. The remainder of the afternoon was devoted to questions and answers particular to the UVA documents and presentations.

Meeting adjourned at 4:40 p.m.

August 14: Full Working Group Meeting convened at 8 a.m.

- Dean Hollingsworth called to order the Full Working Group and presented another safety briefing because some additional people had arrived.
- The group continued with a question and answer session particular to the UVA document.
- Tim DePaepe asked FRA to respond on 3rd party assessment as referenced in the NPRM published on Friday, August 10, 2001.
- Grady Cothen stated that any characterization of the NPRM by anyone associated with FRA does not reflect official agency policy, and is therefore null and void. He asked David Matsuda to respond.
- David Matsuda stated that 3rd party reviews are not required in every case. It is only when FRA sees a need for a 3rd party review.
- Dr. Tom Raslear introduced John Wreathall and Emilie Roth. John Wreathall briefed the group on the Human Reliability Assessment (HRA) Modeling for Rail Risk Assessments. Emilie Roth briefed the group on the Objectives of Qualitative Evaluation. The second Quantification Verification meeting will be held October 29 and 30.
 - Jim Stem asked if Labor will be allowed to participate in the modeling program for the IDOT project. Grady Cothen stated that in the ASCAP Project, a compromise needs to be found so that the project can move forward for all of the stakeholders.
 - Bob McGowan stated that the input of judgement, of all the parties and people out observing the railroad and going to meetings, and arguing their points. We need to make the best use of our resources in order for the ASCAP model to go on.

Grady Cothen addressed a document he prepared, which was distributed prior to the lunch break. There were three bullet items, listing further actions he wanted the various caucus groups to consider. Grady's document, entitled CSXT Pro Forma Case (DTC/CBTM), asked the working group to consider the following.

Requirements:

- Obtain a reasonable level of confidence that top level risk assessment is possible, given the complexity of the system. (Implications for shape of final rule.)
- Document methods useful in future analyses, including illustrative list of assumptions to be tracked after system is placed in service.
- In a concrete case, explore implications of non-vital overlay strategies. What safety gains can be expected? What pitfalls should be taken into consideration if such systems are deployed on a large scale?

Adjourned for lunch at 12:05 p.m.

- After the lunch break, Dean Hollingsworth introduced Cindy Gross of FRA, who will be the new Facilitator of the PTC Working Groups.

The group broke into caucus groups to address the issues passed out prior to the lunch break. During the caucus period, FRA a list of things that need to be accomplished by UVA, with group support. This document, as revised by Mr. Cothen on August 16, 2001, reads as follows:

**Further Actions to Complete / Document
ASCAP CSXT Pro Forma Case (DTC/CBTM)**

Editorial Note: This listing was revised to reflect discussion during the Working Group meeting of 8/15/01, based on individual comments and the general expressions of support for taking a flexible approach to staged development of the ASCAP risk assessment toolset. A schedule projection has been added for further informal review among parties contributing to the effort. Any questions or concerns should be directed to me at 202-493-6302 or grady.cothen@fra.dot.gov.
G. Cothen 8/16/01

Requirements:

- Obtain a reasonable level of confidence that top level risk assessment is possible, given the complexity of the system. (Implications for shape of final rule.)
- Document methods useful in future analyses, including an illustrative list of assumptions to be tracked after system is placed in service.
- In a concrete case, explore implications of non-vital overlay strategies. What safety gains can be expected? What pitfalls should be taken into consideration if such systems are deployed on a large scale?

"To do" or "Punch" list:

UVA, with group support:

1. Further refine TMA to the extent practical / **or** / document peer review comments regarding the further TMA refinements that would be appropriate for exploration in an actual case prepared for submission to FRA in a regulatory proceeding, adding any commentary thought to be appropriate regarding the degree of precision appropriate to achieve fidelity appropriate for comparative analysis.
2. Describe protocol for relating mishaps to FRA-reportable accidents (or accountable accidents) so that calibration can be verified for the base case and meaningful severity work can begin. "Post processing." Complete exercise for identified mishaps to achieve confidence that gap can be bridged without reasonable confidence that the results are meaningful.
3. Provide severity element to complete the model. (FRA will provide suggestion for consideration.)
4. Remove broken rail element of the analysis, since it is not a distinguishing factor between the two cases.
5. Resolve or document any remaining issues associated with random number generator.
6. Resolve whether mishap condition should be created to address authorized following train in same block or siding (restricted speed condition). Correct as necessary.
7. Resolve whether dispatcher / roadway worker interface is adequately modeled. Correct as necessary.
8. Address exposure from movements of on-track equipment by enhancing model or by describing enhancements that would be required in the analysis of a risk assessment prepared for official use.
9. Attempt integration of FRA/Volpe human factors suggestions when available or provide alternate approach that grounds estimates of agent behaviors in the best information available and distinguishes among types of behaviors, at least in broad categories (e.g., do crews leave switches misaligned without coverage and exceed speed restrictions without coverage at the same rates; are violations of temporary restrictions more likely than for permanent restrictions?).

If not otherwise addressed through the FRA/Volpe input, address possible distraction and/or reliance effects under CBTM through a broad-banded sensitivity approach (e.g., what if reliance or distraction doubles critical crew errors? Triples?).

Note:

V&V of computer model is understood not to be a part of FRA deliverables, but FRA will expect to see it when a real-life risk assessment is submitted (e.g., IDOT).

RSAC Working Group:

1. Provide recommendations for resolving the data issue over the long term.
2. Establish consultative relationship with NAJPTC project to monitor and assist risk assessment development (but NOT become responsible for that risk assessment).

Follow-on schedule:

Oct. 29-30 Human Factors workshop (by invitation) – develop additional insights to support FRA/Volpe inputs

November Working Group meeting: UVA progress report on all final model development and documentation, except remaining human factors issue

December: UVA integrates final human factors input, as appropriate, and submits final report

End of FRA Document

The labor caucus submitted the following items for consideration, based on the three bullet points Grady had briefed the group on:

1. Human factor elements and other aspects were left out of the ASCAP model. However, we have confidence in the ASCAP model as a risk assessment tool. A fully developed model of ASCAP will be a useful tool for a base case assessment for future development of systems, sub-systems, and components; and also conforms to our expectations in the proposed rule.
2. FRA accident reporting forms must reflect when PTC systems are in use. Additionally, systems, sub-systems, and component tracking should occur for all repairs, replacements, revisions, and failures of both software and hardware components.
 - Develop a user feedback tool to measure a PTC system's impact on reliance and distractions.
 - Incidents that trigger federally mandated drug and alcohol testing must be reported to and compiled by the FRA.
3. For the question: "What safety gains can be expected?", we expect an increase in safety when applied in a non-vital overlay strategy.
 - **Pitfalls:** Potential exists for reliance on these non-vital overlay systems. There is a concern that an non-vital overlay system may be the ultimate use of the types of technology concerned for PTC and if not required by regulation will neither be maintained nor deployed systematically.
 - Grady Cothen addressed the working group with what he considered some "Not so good news" regarding the ASCAP model:
 1. The sources of the electronic system estimates are not transparent (don't have V&V documents).
 2. TCS case was not undertaken, so the cases we have prepared *do not involve a change in the underlying method of operation.*

- Alan Polivka gave a progress briefing on the North American Joint (Illinois) Project.
- Howard Moody gave a briefing on Train Control Standards Update.
- Andy Schiestl, BNSF, gave a briefing on Hy-Rail Limits Compliance System Overview and DIGITCON Wireless Authority Project.
- Ed Dobranetski, NTSB, read an excerpt from a letter the NTSB had recently sent FRA regarding Board recommendations on PTC. The complete document is posted on the Volpe web site as indicated at the beginning of these minutes. The excerpt read by Mr. Dobranetski is as follows:

“The Safety Board also acknowledges the ongoing work of the FRA’s Railroad Safety Advisory Committee, which in 1997 established a working group to address PTC. Among other objectives, the group is attempting to address the current Federal regulations and their applicability to new train control systems under development and to draft new regulations as necessary. The working group has also done preliminary work to identify specific rail corridors where a PTC system would have the greatest impact.

Despite these partial initiatives and other efforts in the area of PTS, the Safety Board continues to be disappointed with the pace of development and implementation of collision avoidance technologies. As noted above, the FRA and the railroad industry have created numerous study groups and carried out several demonstration projects and, in some locations, have successfully implemented systems with collision avoidance capabilities. Nevertheless, no plan for industry-wide integration has been developed. And while progress has been particularly slow along rail lines that primarily serve freight carriers, even those lines with significant passenger traffic remain largely unprotected today, some 11 years after this item was first placed on the Safety Board’s “Most Wanted” list. Meanwhile, the Safety Board continues to investigate accidents that could have been prevented by a working PTC system. The Safety Board concluded that, without the installation of PTC systems, preventable collision accidents will continue to occur and will continue to place railroad employees and the traveling public at risk.

The Safety Board acknowledges progress in this area but is disappointed that automatic train control standards have not been established after 14 years. The Board will continue to urge the FRA to require the implementation of proven collision avoidance technologies. In the meantime, and in recognition of the promise of PTC, the Safety Board believes that the FRA should continue to focus on this issue and facilitate the actions necessary for development and implementation of PTC systems that include collision avoidance, and require implementation of PTC systems on main line tracks, establishing priority requirements for high-risk corridors such as those where commuter and intercity passenger railroads operate.”

Meeting adjourned at 5:15 p.m.

Editor Note: A document sent by Denise Lyle of CSX to Dr. Ted Giras of UVA is included in these minutes as an attachment.

Attendance was as indicated in the following table:

	L_Name	F_Name	EMail
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11	Dorer	Bob	dorer@volpe.dot.gov
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Attachment:

Denise Lyle (CSX) sent the following to Dr. Ted Giras concerning discrepancies in the Train Management Algorithm (TMA).

Please clarify the following:

When the TMA shows “Request for Next Block”, is that actually the next block the train is entering or the next block plus one.

Example: On Sunday, unloaded, northbound train #17 shows a “Request for Next Block” at 0212 hours. The TMA also shows the train exiting the Augusta block and entering the Martinez block at that same time, 0212 hours. Hopefully the block request was for Woodlawn, not the Martinez block. If so, this assumes that the Martinez block was granted at the same time as Augusta, which infers that trains are always granted two blocks before exiting the yards. This is not necessarily the case. If the block request is for the Martinez, it cannot occur at the same time the train enters the block.

Below are things the TMA doesn’t do:

Never shows a northbound and a southbound train in the same block after a meet has occurred.

Indicate when blocks are released.

Place more than one train in a siding.

Never shows trains held out of yard at Roebuck or Ora siding and then yarded by a returning pusher.

No locals.

No pushers returning light.

Problems that need to be corrected:

The TMA has northbound trains exiting blocks and entering sidings at the exact same time a southbound train is entering the same block on the same end.

Example: On Tuesday, northbound merchandise train #22 exits the Plum Branch block and enters the siding (see bullet no. 3 below regarding siding names) at 0808 hours. At the exact same time southbound, unit train #3 enters the north end of Plum Branch block which is right at the switch to the siding.

This may be a characteristic of the discreet simulation, however the timing is awkward.

There were no meets shown on the Spartanburg subdivision. A northbound train will take a siding 1-2 times between Spartanburg and Ora, to meet other trains. Most will take place at Roebuck or Ora sidings. Kilgore is not used much because of the number of road crossings that would be blocked.

Half the time a northbound train will take a siding between Ora and Park Junction, mostly at Waterloo,

to meet other trains. Irby is not used much because trains must back out.

The names of sidings on the McCormick subdivision are incorrect. The sidings on the McCormick sub are:

Martinez
Woodlawn
Modoc
McCormick
Bradley

Northbound trains will take a siding 1-2 times between Augusta and Bradley to meet other trains. Bradley siding is used the most and was not shown at all. McCormick and Martinez are frequently used. Modoc is not used as much because of the number of road crossings that would be blocked. Woodlawn is designated for storage only, no meets.

Need to check the times for train #1 when it requests the next block and exits the Waterloo block. These values are approximately one hour apart on all days, but are the same for other trains using this block. If this is correct, what makes the Waterloo block different?

Differences between actual and simulated operation:

The TMA shows a train has entered a block at the same time it exits another.

Most of the time, trains obtain authority at block limits.

Trains typically hold several blocks unless they are closely following another train. In this case the lead train will release a block, so the dispatcher can immediately issue it to the following train.

The TMA has the same trains vary each day between 22-24, does not take into account curfews, annulments and consolidations.

Things just don't start over the next day. Actual operations must deal with the leftovers from the previous day.

Trains move over the territory faster than actual operation. 25-30% of the trains go on the law before reaching Spartanburg or Augusta. The table below shows what the dispatchers think is a "good" average runtime for all trains between locations, versus the runtime shown by the TMA. The dispatcher runtimes are based on the train getting to that location and waiting for opposing traffic. 50% of the time southbound trains are waiting on the main for northbound trains to take the siding for a meet, which makes there travel time over the whole territory longer. The fact that locals and light pushers were not included probably contributed to the TMA calculating a shorter travel times over the territory, as well. Table 2 compares the average travel time obtained from several train sheets, to the average calculated by the TMA.

Table 1

From/To	Run Time (mins.)	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Augusta to Martinez	30	11	12	12	12	11	11	12
Martinez to Modoc	50	44	45	43	46	44	45	45
Modoc to McCormick	30	33	33	34	33	34	33	32
McCormick to Bradley	30	48	48	49	48	48	48	49
Bradley to Park Junction	20	15	15	15	15	15	15	15
Park Junction to Irby	60	51	52	55	51	51	52	53
Irby to Ora	30	18	23	18	20	19	23	18
Ora To Roebuck	75	75	73	74	73	73	75	77

Table 2

From/To	Actual average (Unit)	TMA average (Unit)	Actual average (Other)	TMA average (Other)
Augusta to Spartanburg (NB)	7 – 11 hours	6 ½ - 8 hours	11 – 13 hours	6 – 9 hours
Spartanburg to Augusta (SB)	9 – 13 hours	5 – 6 hours	9 – 12 hours	4 1/2 – 6 hours
Ora to Spartanburg (NB)	3 ½ - 5 hours	2 ½ - 3 hours	N/A	N/A
Spartanburg to Ora (SB)	2 – 2 ½ hours	1 – 1 ½ hours	N/A	N/A